

INTEGRATED WORK-SPACE MODULE FOR INFORMAL MICRO METAL INDUSTRIES OF ZINZIRA, KERANIGANJ, DHAKA

Srijon, Barua*

Department of Architecture, University of Asia Pacific, Bangladesh

Abstract

A silent industrial revolution has been taking place on the banks of river Buriganga, Zinzira, Dhaka. In comparison with other giant industries, Zinzira have been playing a significant role off the record in recent years. The scenario has generated from quite an unorthodox context and term “made in Zinzira” .During 70’s- 80s’s a special group of skilled workers started to emerge in Zinzira who were mostly hardware mechanics. By only using scrap metal and local knowledge they can reverse engineer expensive machines locally in much less costlier fashion. The term “made in Zinzira” originated from this skill of “reverse engineering” which is somewhat seen in negative lights as counterfeiting and cheap products. As a result, lack of infrastructure, proper workstation, working environment from the scale of the community hinders the potential of this sector. The research & design scheme tries to explore the relationship between the work environment and existing infrastructure within the urban fabric of Zinzira. The aim is to determine a sustainable solution of modules that could be the holistic interface that this specific micro metal industry deserves, as the capital and investments are crucial for the owners and workers of this type of small scale industries. The research will conclude via the comprehensive investigation on how to explore and improve work-space relationships of micro metal industries theorizing schematic work-space modules in order to establish Zinzira as an asset to be recognized in reverse engineering sector rather than leaving it over shadowed by wrongly describing it a counterfeit production industry.

Keywords: Reverse engineering Workshop, “Made in Zinzira” , Sustainable micro metal industry

1.Introduction

* Corresponding Author:Srijon Barua; E-mail- srijon.barua@uap-bd.edu

Historically Zinzira was the commercial hub of Dhaka. During the Mughal period, the production of goods started to flourish orienting this port area. The situation remained same until the CBD started to move out of old Dhaka to Motijheel area. Since then the new Dhaka has become the centre of focus. After the birth of nation in 1971, major trade and industries shifted its course towards readymade garments, leather, pharmacology and other sectors. On the other hands old parts of Dhaka like Zinzira remained active with its small scale micro metal industries and continued to be skilled unnoticed in its own sector. However it is interesting that now, both parts of the cities are apparently in need of mutual synergy and many are unaware of the fact that Zinzira (keraniganj sub district) is going through an industrial revolution of its own kind.

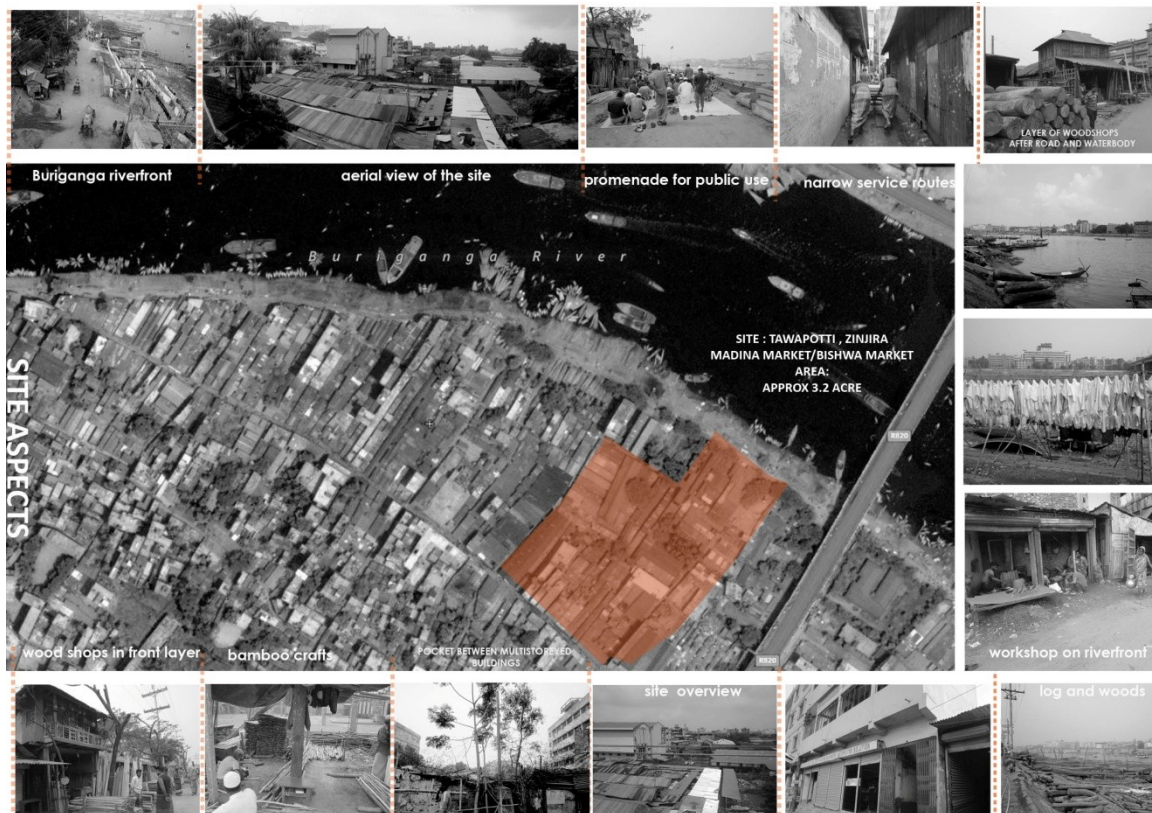


Fig 1 : overview of site and its morphology , activities surrounding the site.

Although the term “made in Zinzira” is mostly associated with fake, adulterated or inferior products, it will not be fair to draw a totally dismal picture of the products that come out of this industrial area. Zinzira receives good amount of bad press, which usually overshadows its better aspects. The drive for establishment of medium-scale industries at Zinzira began after independence when most non-Bengali owners of industries left the country. Their abandoned assets went into the hands of their local representatives who expanded the existing enterprises as well as set up new ones.

Soon, their attention focused on Zinzira where lands were available at comparatively lower prices. Thus, industries of various kinds began to grow there. It is estimated that there **are more than 300 informal metal workshops** at Zinzira whose products have won a good name in the market. Although the meal workshops are producing utensils and other household products, the area is vastly well-known for its production of reverse engineered products of various types.

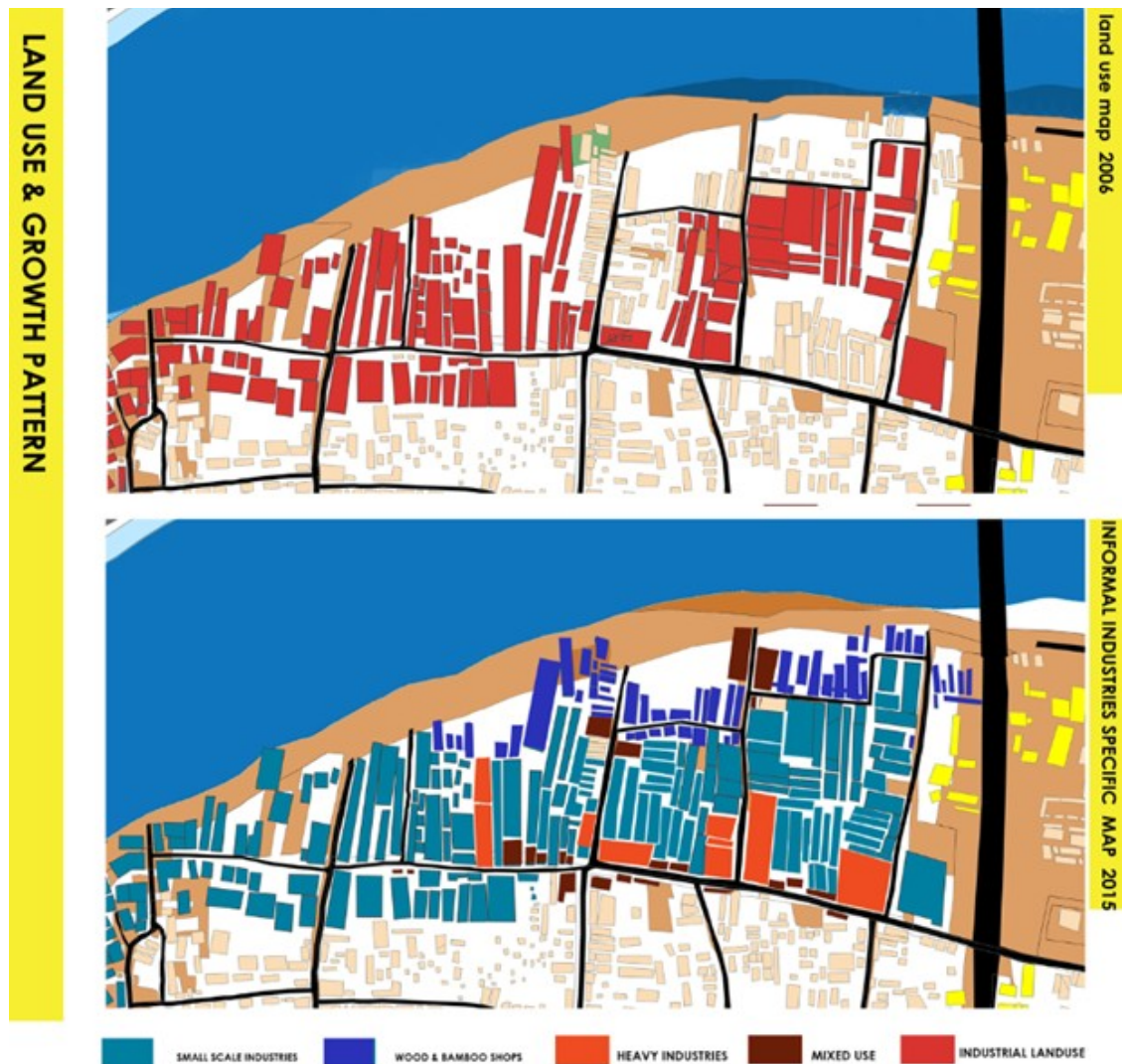


Fig 2: Land use and growth pattern (2006-2015)

Its stated multiple times in local newspaper that Zinzira has manpower and skill that can produce almost any kind of mechanical products (example ranges from machineries to almost all types of motorized vehicles) given the plans and materials for it. Now-a-days this controversial mode of Informality and formality have linked such a way that one can't survive without the other. But the main problem is the un-organization of the economic zone inefficient production process derived due to it. This is also a common character of such growth pattern in many of subcontinent economic zone according to Samal [1].

2.Scope of work

The research is largely conducted by intensive field survey by the author. The lack of secondary source data made it difficult to relate with greater urban perspective. Author had to depend mostly on the primary source of data . The research is largely contextual .It is conducted in a context that deals with counterfeit and reverse engineering products generated from small scale metal industries (SSI) . The topic might arise controversy regarding the threshold between formality and informality of these issues, generated locally and thrived spontaneously within a time span of 30-40 years. Literature reviews are very few to say for this type of research and the primary source has to be taken as the major base for the substance created by the author. An

important set of resources are found from Rumana A. “A study on the impact of 2nd Buriganga bridge on the physical and socio economic condition of keraniganj upazila. 2010” and Hasan. *Location analysis of manufacturing industries in keraniganj* 2009 .

3. Growth pattern and operational dynamics of informal metal industries

Growth of metal industry in Zinzira is not organized rather imposed and linear which prevent using the full capacity & potential of Zinzira. Migratory status shows that most of the people working in Zinzira are not local. Almost 60 % of workers come from Barishal district . Newly formed industrial area did not have any planning and the urban form resulted in an un-organized linear pattern. Lacks of ample lights, airflow and faulty circulation pattern have become a threat not only to the workers but also the locality.

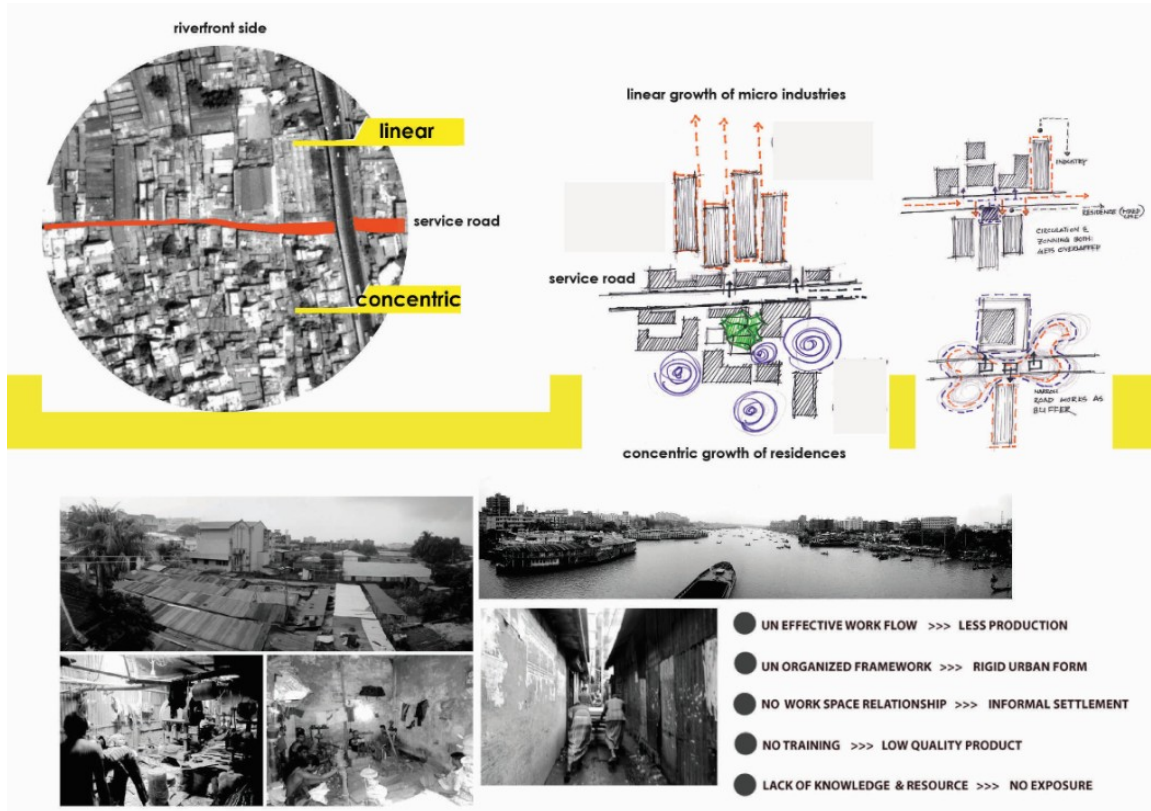


Fig 3: Dual morphology of the industrial (metal) and residential zone only divided by narrow service road.

So even if the problems are multiple and of various types, the root of all problem lies on the lack of proper workspace relationship and unorganized linear urban growth. 10’ wide road is the only buffer between industrial zone and mixed use residential portion. The road is also the service route for raw materials of industries coming from all over Dhaka which results in some major problems such as overlapping of circulation, inefficient transportation of raw materials, traffic jam on the circulation path. So heavy industries along with small scale micro industries (S.S.I) create chaotic circulation pattern and operational dynamics between them has no threshold of tolerance whatsoever.

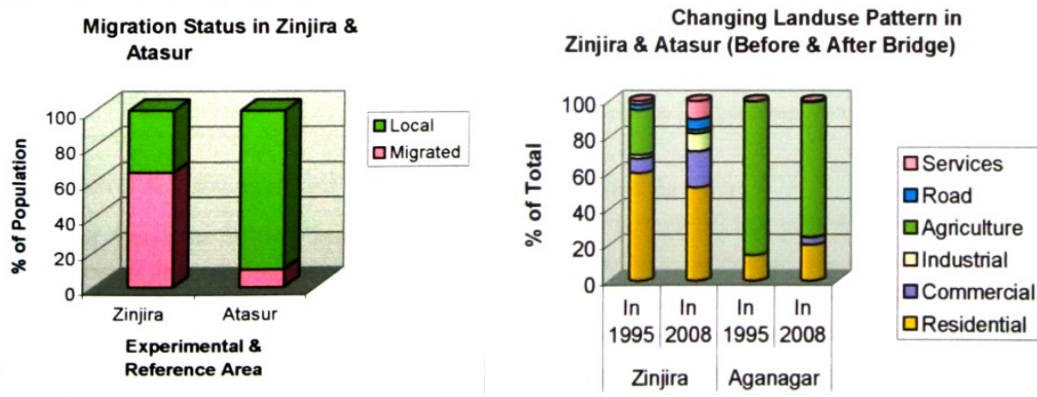


Chart. 1. Changing land use pattern in Zinjira after the completion of bridge

There is a significant change in the land use pattern all over the sub district specially the area adjacent to the bridge . For example the study area Zinjira is 244 hectares where in 2000 there were 512.35 acres of agricultural land, in 2006 it became zero acres. Recent trend of increased commercialization has changed pattern of Zinjira area. But the scenario is quite different in areas of inner villages like Atasur. The reason behind the difference between Zinjira and Atasur is that new developments and changes are happening alongside the major thoroughfares and adjacent to the bridge.

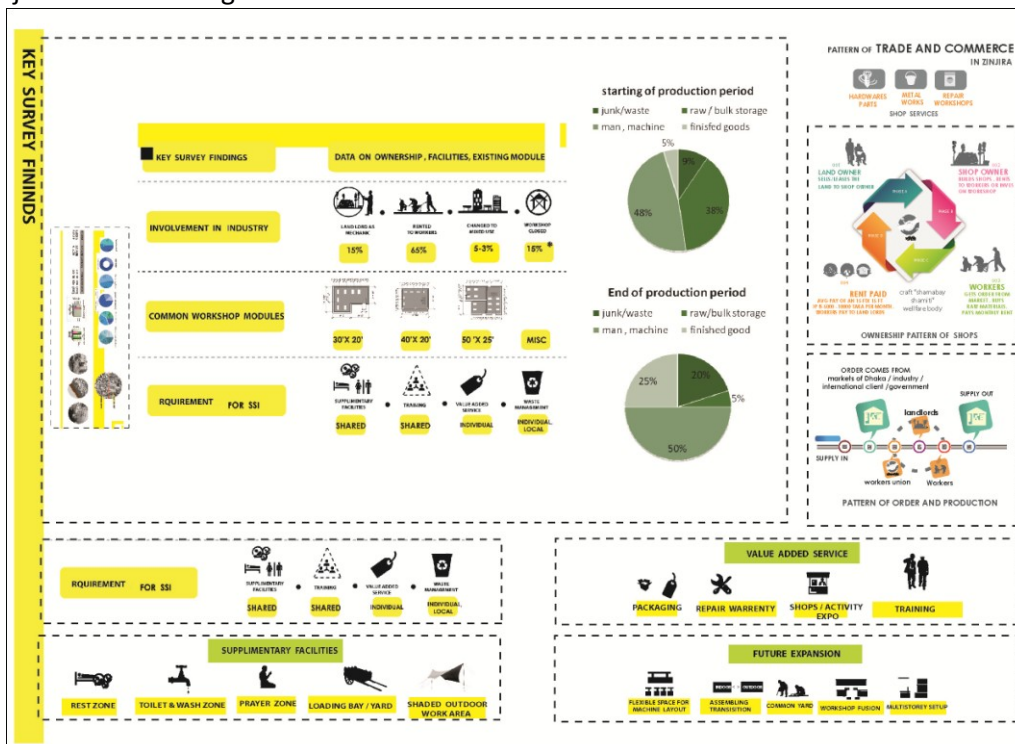


Diagram 1: Key survey findings on land ownership, typical workshop occupancy and lack of facilities.

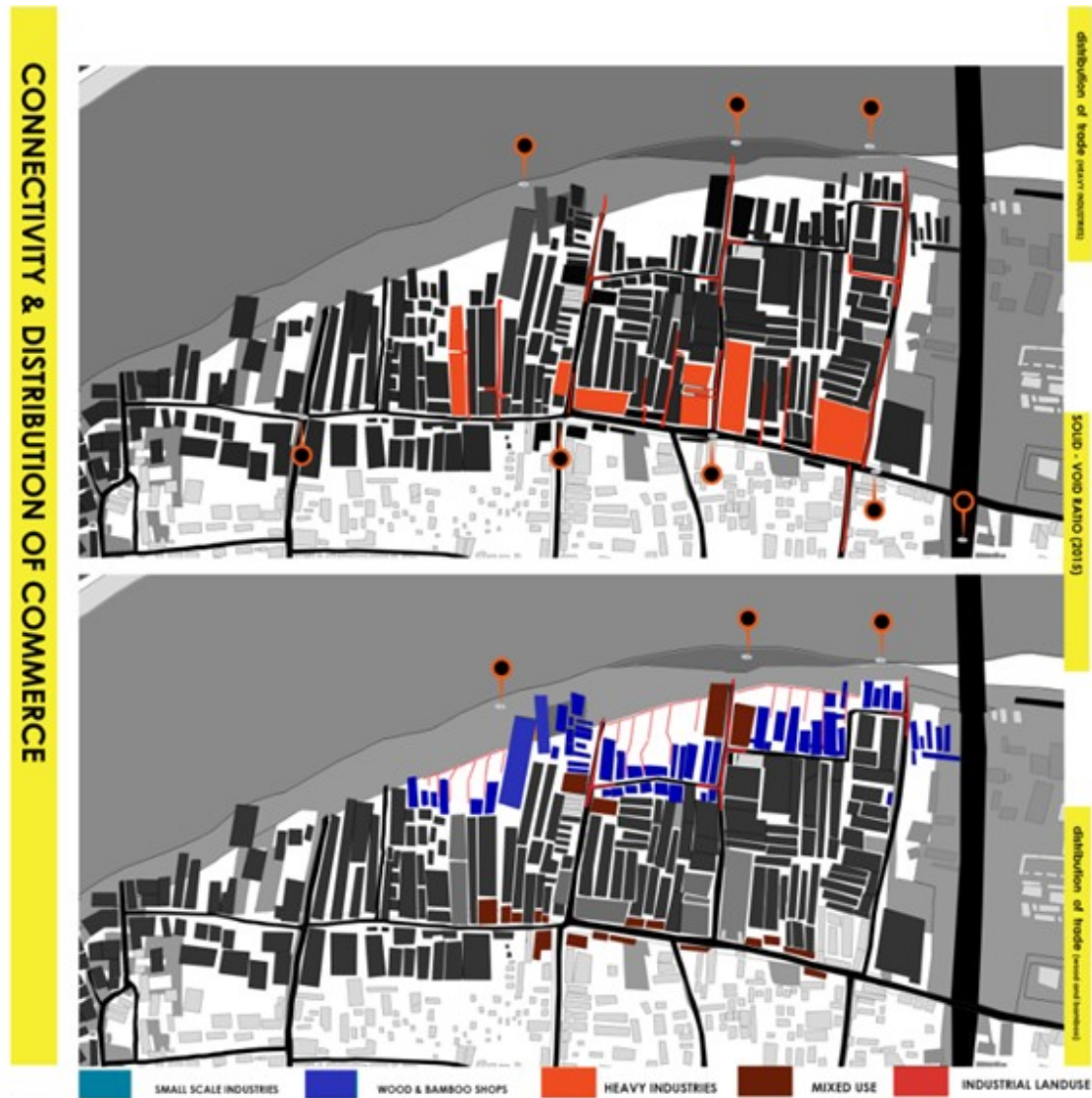


Fig 4 : riverfront , service road and access points of goods . distribution of commerce

Most of the people involved in the industrial activities are migrants. On the field survey it's found that almost 60% of population comprises of migrant people. These people are mostly from Barishal and Pirojpur. Buriganga is connected with Barisal via waterways and the trading

(Mostly woods, logs) is very frequent and dominant between this 2 places.

Newly formed industrial area did not have any planning and the urban form resulted in an unorganized linear pattern. The metal works market of Tawapotti of Zinzira faced the worst of it . Unplanned and dense workshops built over the years turned the locality into an environmentally damaged and much less , a productive area . Lacks of ample lights, airflow and faulty circulation pattern have become a threat not only to the workers but also the locality. So even if the problems are multiple and of various types the root of all problems lies on the lack of proper workspace relationship and unorganized linear urban growth.

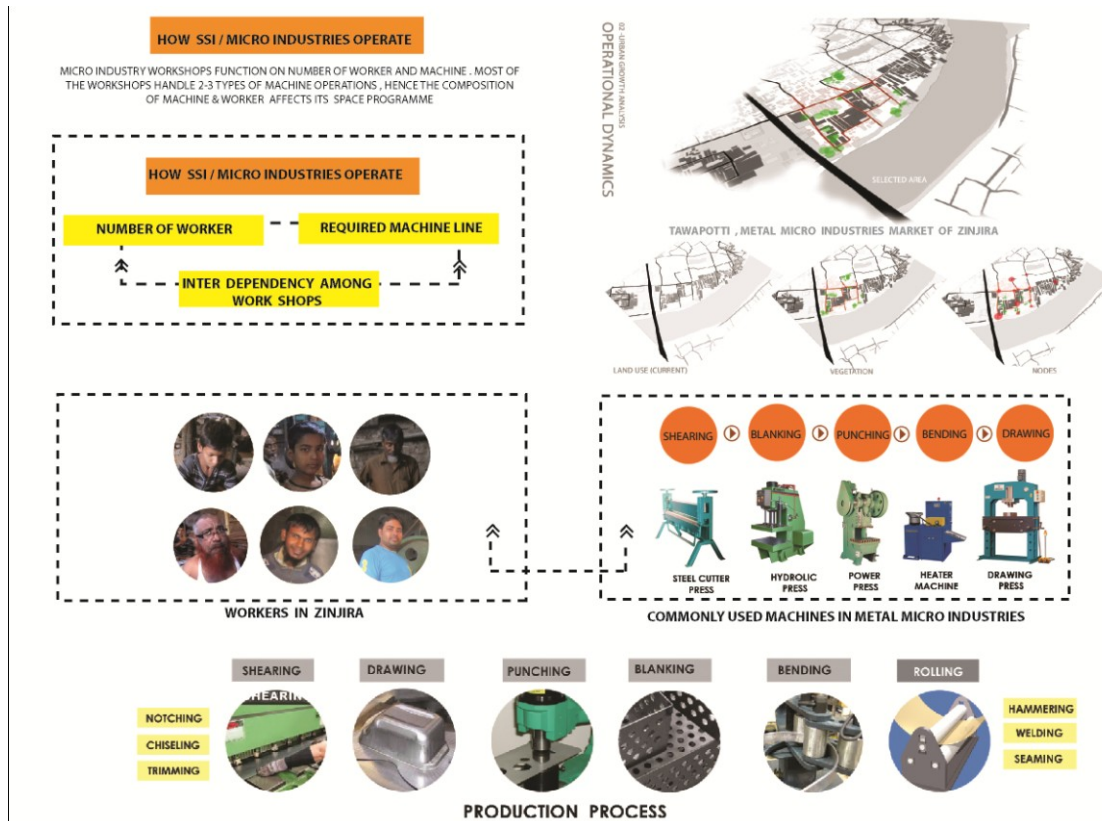


Fig 5: Types of machines used for production and reverse engineering. Steps in production process.

Small scale micro industries depend on inter metal-workshop sharing of machines. Different machines are required for each step of production which is not essentially owned by each of the shop owners. The service spines are frequently used to carry raw and junk metals for tool based operational purposes. In short the demand or depending on the order of products, the shop owners have to evolve and game up their production. Be it the order of mass production or large reverse engineering products, Zinzira has to use different aforementioned machines for smooth production which might not be owned by each shop owners. Hence the operational dynamics can be largely modified for efficient workspace and production.

4. Problem Statement

According to a MURP thesis of 2010 by Rumana Akhter entitled “A study on the impact of 2nd Buriganga bridge on the physical and socio economic condition of Keraniganj upazila” the physical form of Zinzira after the opening of 2nd Buriganga bridge have changed drastically. Resulting a land price hike of significant difference among the two opposite sides of Keraniganj upazila. This event was inevitable as the same case is bound to happen where road networks get upgraded. Akhter [2] reported that the similar scenario was seen in 1989 when the Japan Bangladesh friendship bridge connected southern parts of the river and had considerable impact on the development of the areas adjoining the highway, such as Sreenagar, Zinzira, Nawabganj and Dohar.



Fig 6.1 : identifying the in situ problems (photograph source : author)

Recent survey by author shows that despite of such attempts to better the communication and trade , the overall situation for industries have not brought developments up to mark . In fact small scale and micro metal industries have faced a rather backward scenario where shops had to be closed down due to lack of profit and facilities.

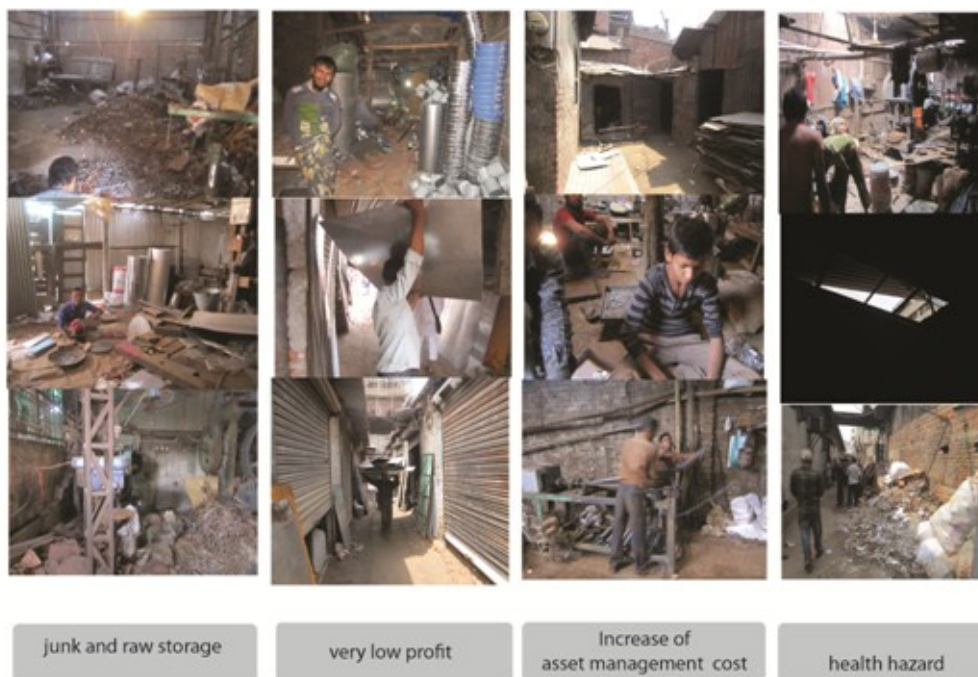


Fig 6.2 : identifying the in situ problems(photograph source : author)

If the aforementioned context can be taken into a top down pyramid the problems can be identified and broken down to few crucial factors behind the un-organization of the industrial zone.

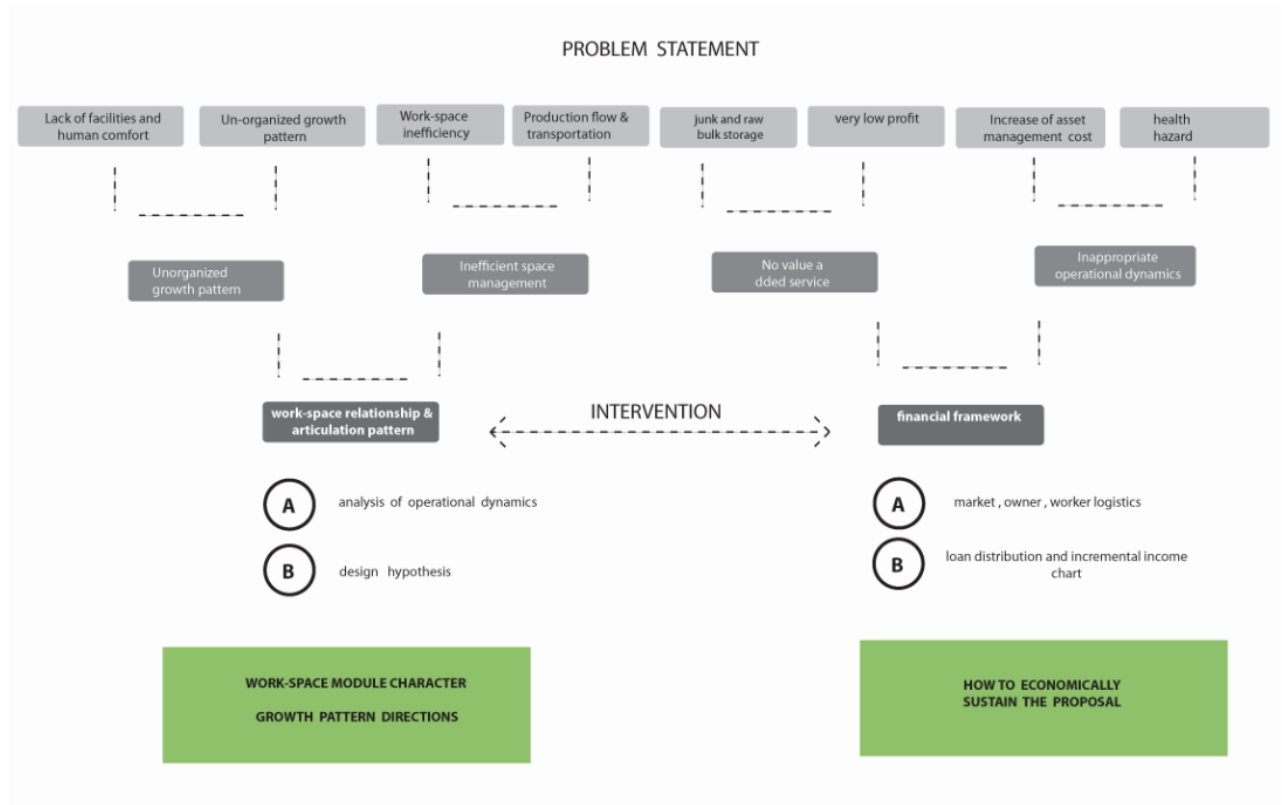


Chart 2 : Top down situation of the in situ problems

According to Hasan [3] , After the opening of 1st Buriganga bridge in 1989 and 2nd Buriganga bridge in 2001 , land value increased from 400000 taka per decimal to 1000000 . This brings along a change in the trend of land use pattern. The difference in land price became as high as 20 times in some backwards southern part of Keraniganj and Zinzira.

Local land owners started to sell off lands in Zinzira and moved to the inner parts of the Keraniganj upazila. Zinzira and its adjacent area became a prominent stage for industrial setup ushering a new age of cheap and reverse engineered products during these 20-30 years. According to Atolagbe [4] , problems with small scale or home based industries are lack of training and quality of products produced by them.

This unseen problem can be identified as an important factor to these small scale industries or informal sector in general that the products cannot provide enough value. If the sector has to survive the production has to provide better value added service. For example and warranty or packaging of these products can largely change the outlook towards these workers and their low cost products. In turn the value added service can increase the price of the product. So this problem generated by this issue equally important for both the mechanics and the consumers.

Figure 3 Major Physical & Socio-Economic Changes identified by the Residents after the Bridge

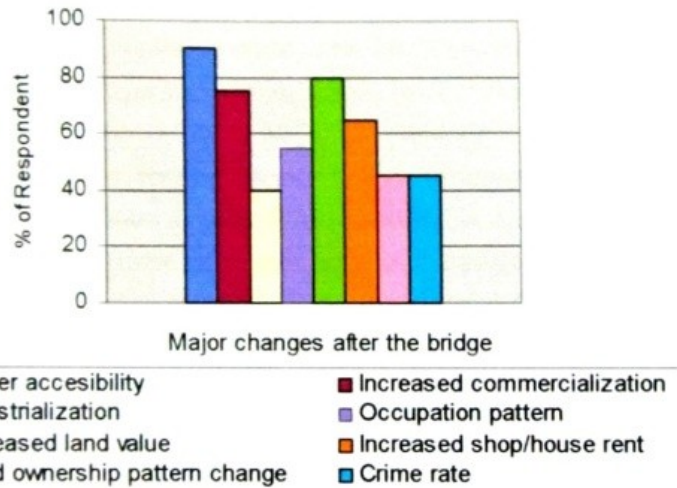


Fig. 3. Aggregate from questionnaire survey, impact of the land after the construction of the bridge over the Buriganga connecting Zinzira to the Dhaka city.

Dharavi, case studies of such informal manufacturing hub of the infamous slum of Mumbai and their interventions are found on the research of Boano and hunter [5]. Furthermore the intervention process is illustrated on the essays of Scott [6] on how a pilot project of such magnitude should be handled.

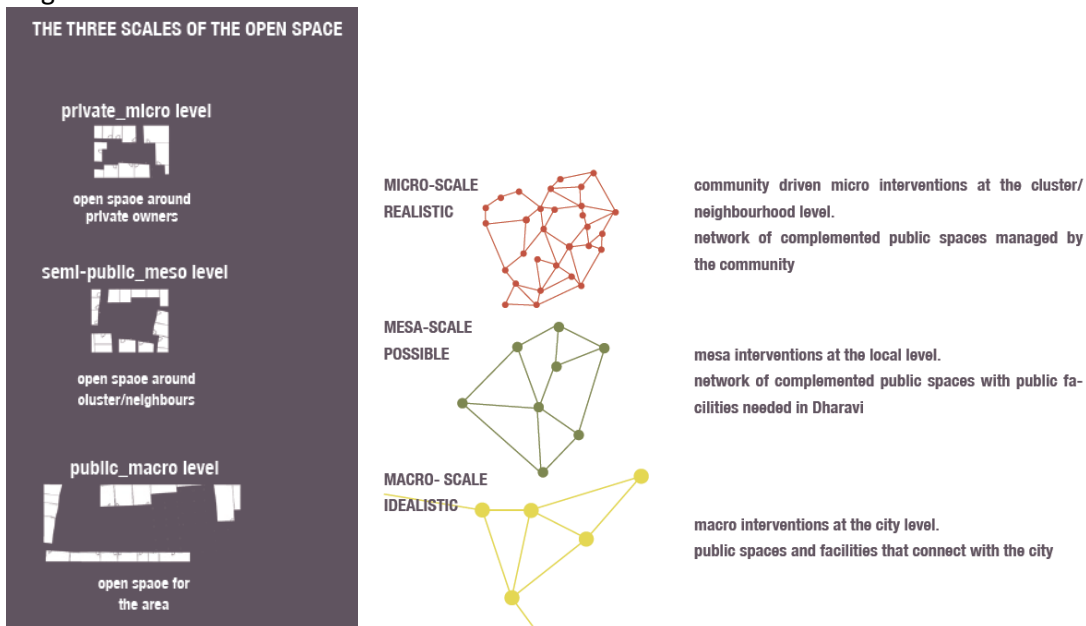


Fig 7 : Boano and Hunter model for Dharavi commercial zone development.

5. Methodology and conceptual framework

The methodology of the research depends largely on the development of primary data collection phase conducted by the author. The following diagram shows the sequential steps taken to conduct the research as the references of such investigations are rare.

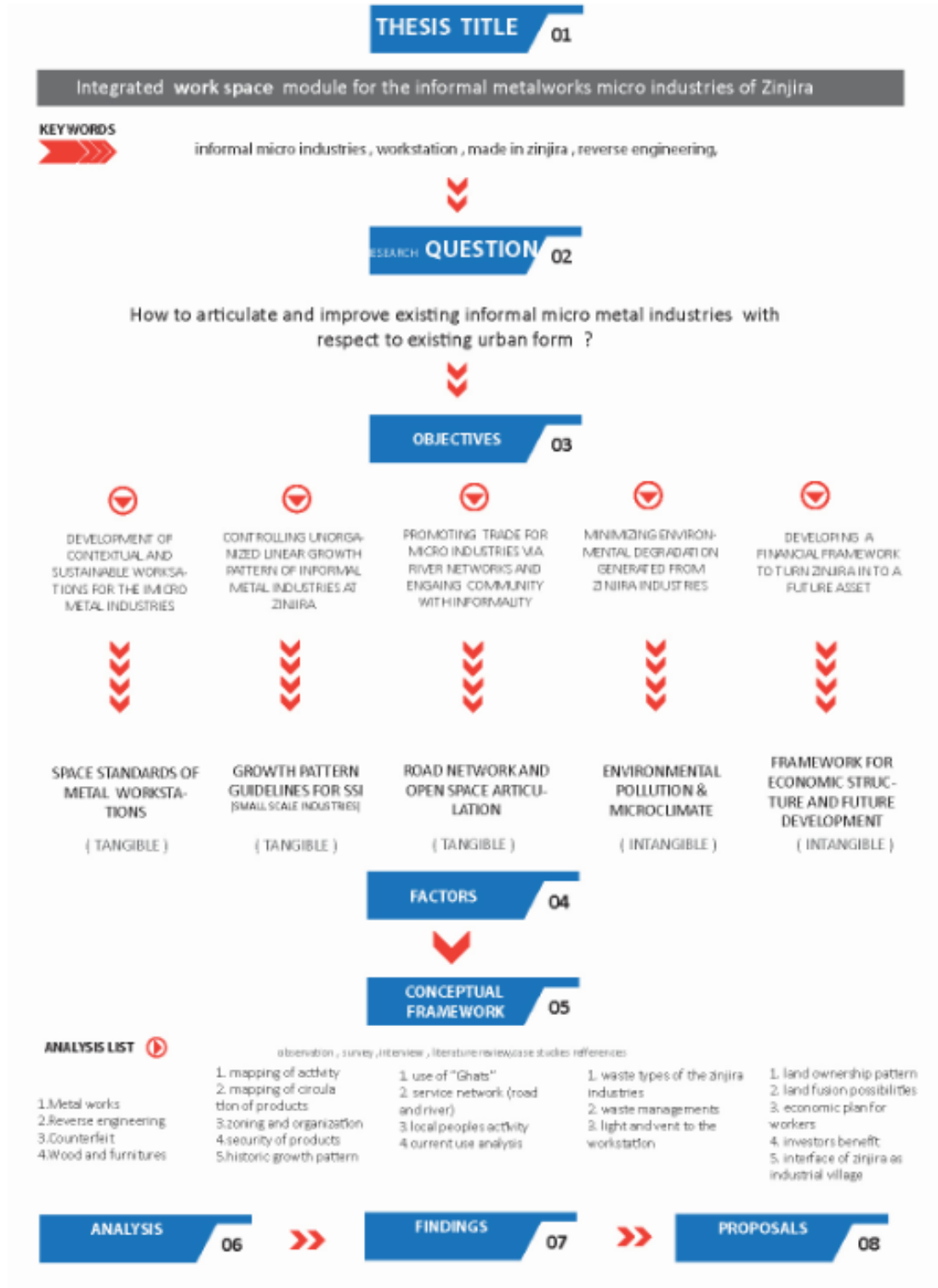


Diagram 2: Detail methodology

The research is focused on the issue of proper intervention to restore effective workspace relationship for micro industry of metal works with respect to existing urban form. The key factors to be considered to reach a solution are the existing workstation layout, environmental quality, productive open space integration and articulation of module clusters which comprises the overall “work-space “ of a micro industry.

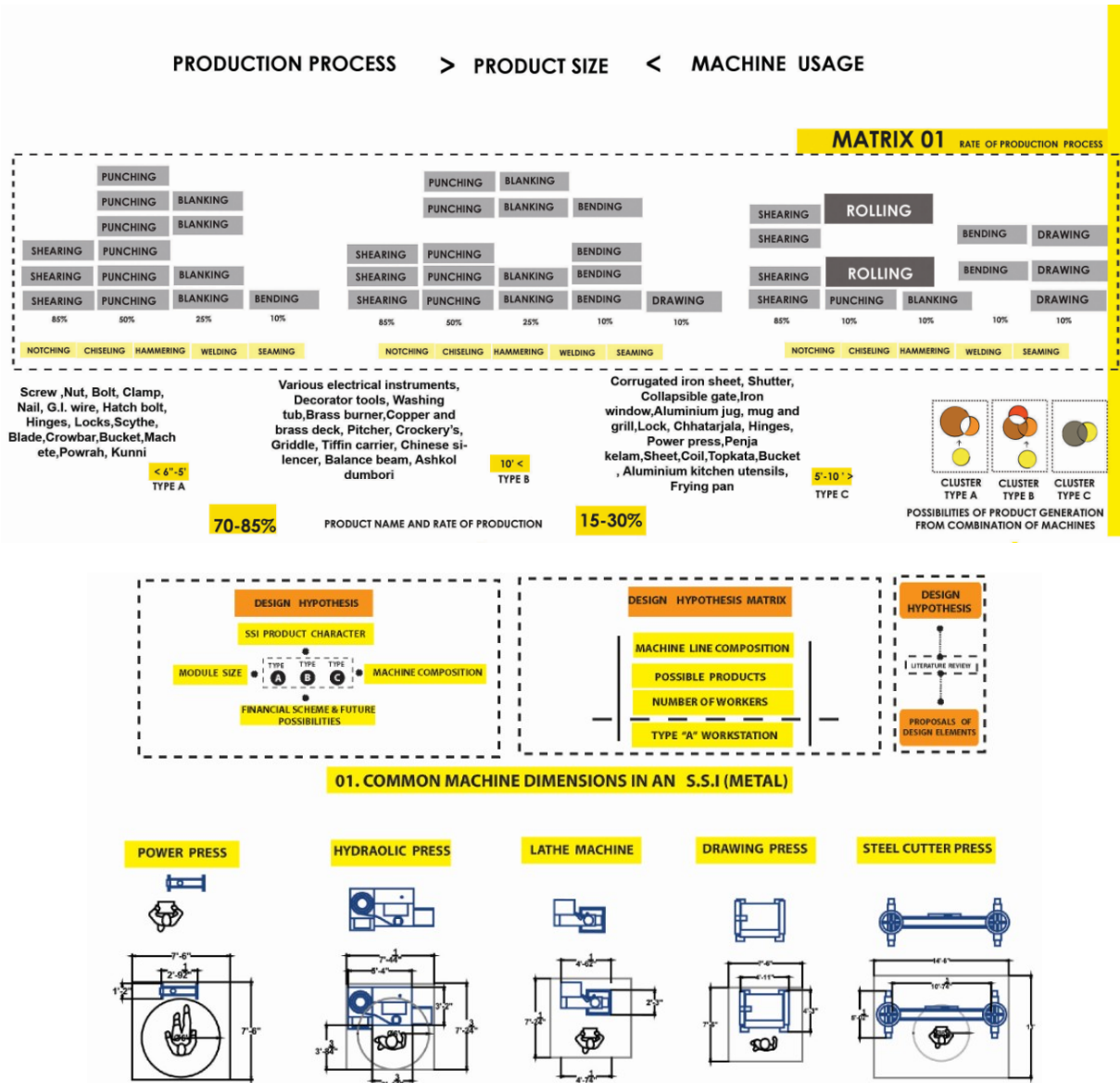


Diagram 3: relationship of product size , production process and existing composition of machine usages.

The research also faces future flexibility of modules as the nature of the problem is evolvable through time .Author had to separately comprehend physical tangible factors and factors which deal with more intangible but associates socio economical policies.

6. Development of Design Theory & proposals

According to Jos Frijns, micro industries constitute 1-9 workers. Based on the standard the number of workers and minimum space requirements are generated. Which is the similar scenario of the micro industries of Zinzira . The existing 500 small workshops can be generated in such a fashion that the module can be used for future extension and expansion of the industry in case the machine dimension changes with time. **The main concern should be the maximization of per square feet income versus the rent ratio for these types of modules .** Small investments create opportunities for smaller production but the opposite can be done by the systematic organization of modules and work spaces. For that author has to decide on the various module sizes satisfying flexible needs of the small scale metal industries.

6.1 Module size and their articulation compositions

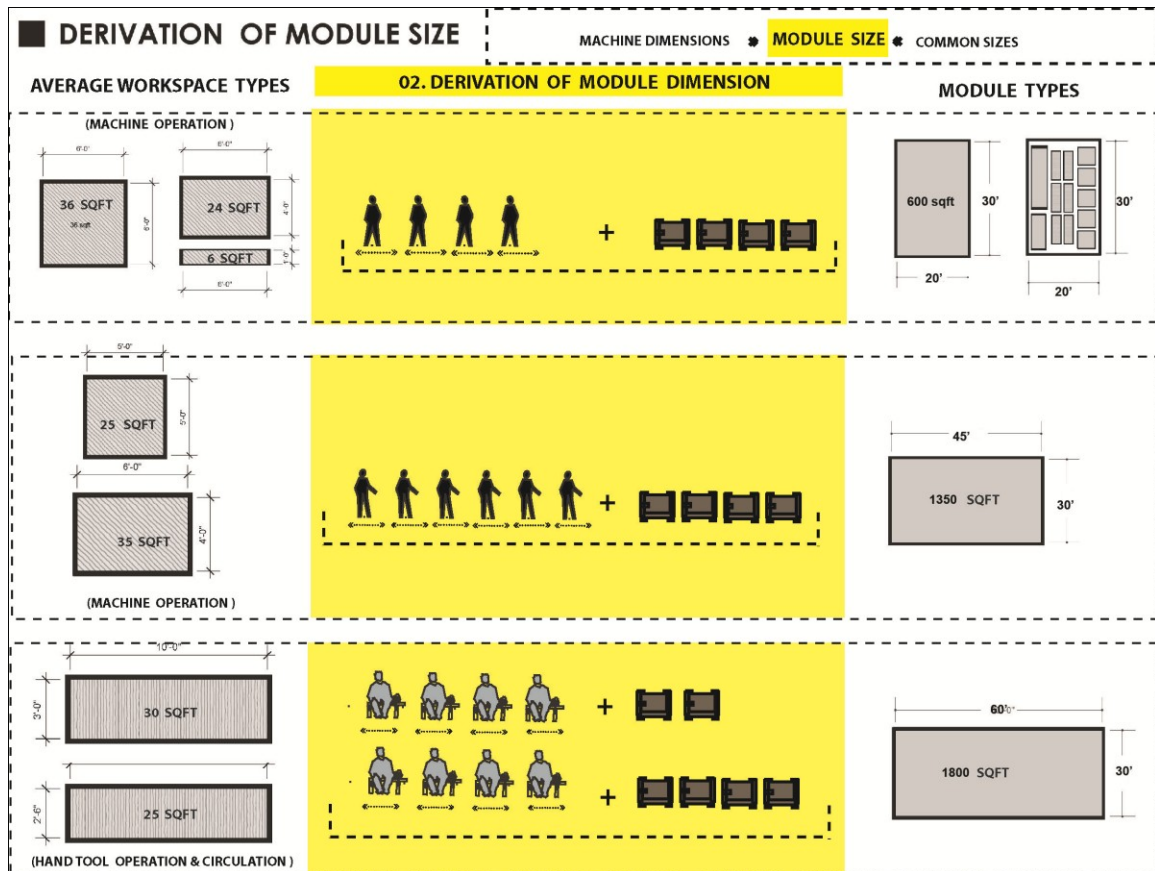


Diagram 4: derivation of module size

This design hypothesis/theory is the basis for deriving module size which helps layering the products with respective machine layout and number of workers involved. And following this process, multiple types of production line can be designed as per requirement. The hypothesis is illustrated via diagrams.

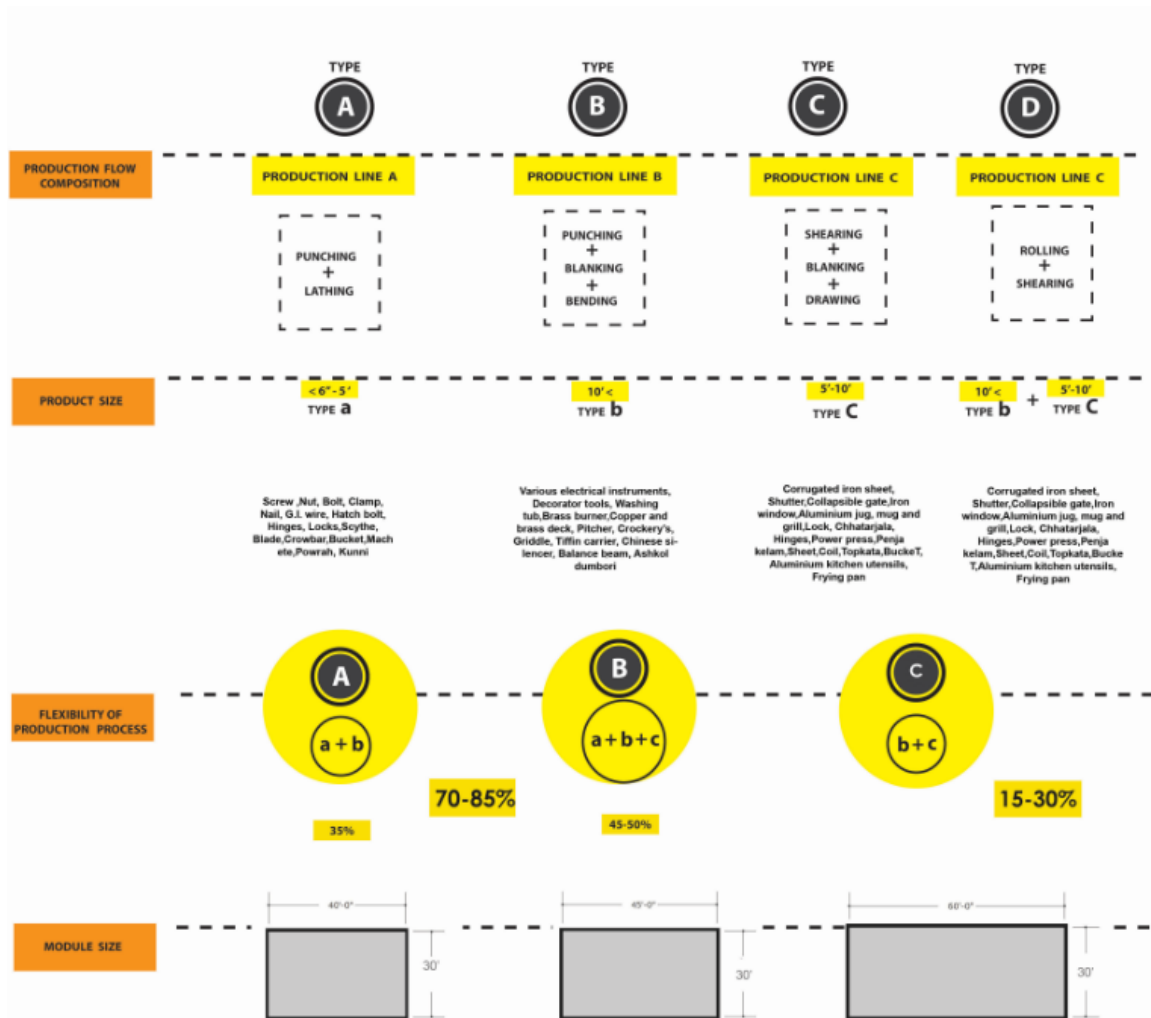


Diagram 5. Generating matrix for module dimension and arrangement of machine lines for effective workflow

6.2 Environmental considerations and functional dynamics layout:

The overall morphological and economic structure of Zinzira metal industries may seem rather unorganized and chaotic. But some characteristics are better suited for the operational functions of these industries. For example the linear morphology of the workshops is necessary for the internal service route purpose, but the linearity has to be in an efficient and organized pattern. Some proposals can be generated to make the situation and urban form better. The intervention of Zinzira should be done marking Zinzira as a special industrial zone. As hot humid climate is quick to increase the temperature of metal industries its of utmost concern to create cluster patterns that does not create urban heat islands. At the same time rented space is of most importance for investors. **The workspace is not only the indoor of a workshop but also the open yard plays crucial factor for processing metal and junks. Junks occupy a large amount of space rented by the shop owners. (see diagram 1) the design mechanism should address the shared feature of junks so that the maximization of rented space. can be done**

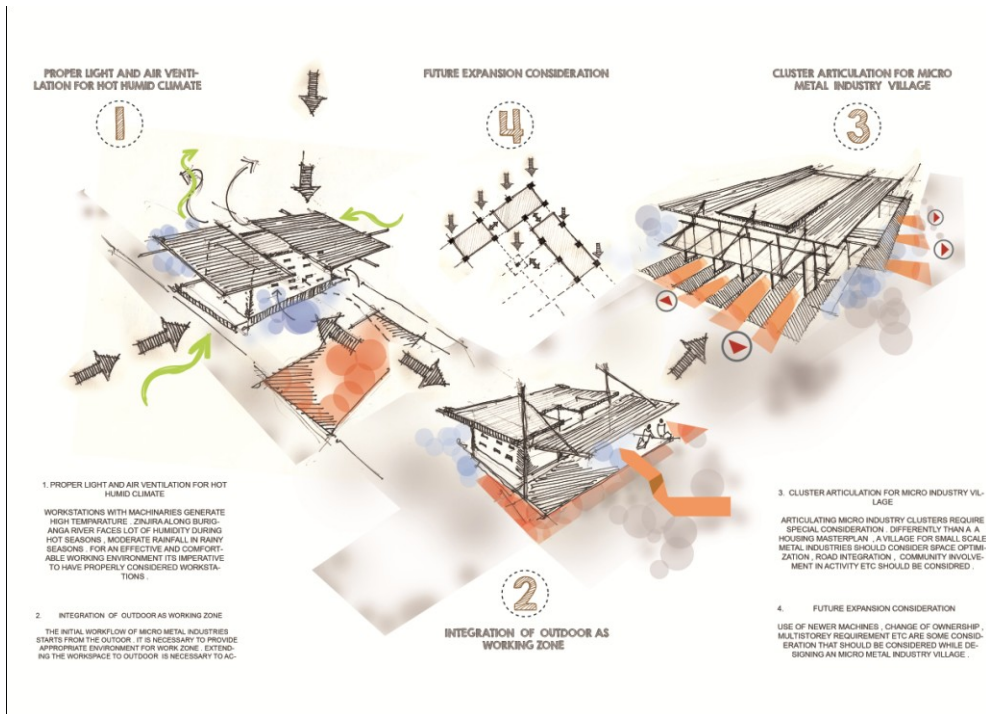


Diagram 6: 4 major considerations for design theory .

However some informal economic dynamics of Zinzira should be preserved as it is right now. done in separate phases. The appearance has to be formalized with local materials and building technique to give Zinzira an interface that recognizes and adds value to the industrial zone. Otherwise the trade and commerce flow of Zinzira will not be able to flourish. Rather it can be

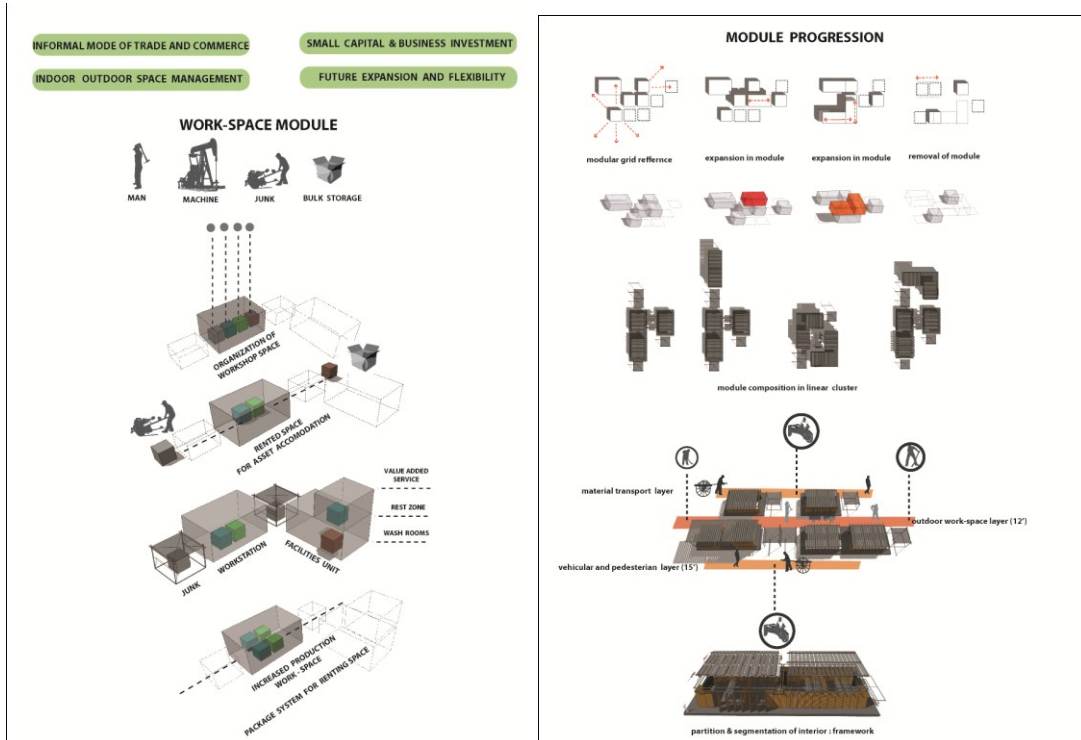


Diagram 8 :Shared Junk management and derivation of articulation pattern of the modules.

6.3 Urban scale intervention and master plan guide lines

If Zinzira has to be recognized as an asset rather than a liability for its reverse engineering and metalwork's industry, it has to be given an interface. A recognition as Zinzira special economic zone. The Zinzira economic zone with the aforementioned proposals needs to address the urban perspective. The development proposal has to reflect some important factors as the schematic guideline for Zinzira economic zone. Urban form should be structured according to the module articulation and work space dynamics with respect to the service route proposals for these type of cluster arrangement. Riverfront and edge conditioned should be designed according to river trade and commerce facilities. Service roads connecting main vehicular access should be broadened to accommodate the needs of the industrial zone. Proper workspace clusters have to provide living spaces and restrooms for the workers who will be staying in the workshop for longer periods. Training center, garbage management and exhibition or expo centres could be important elements to add values to the products of the economic zone and their future promotion.

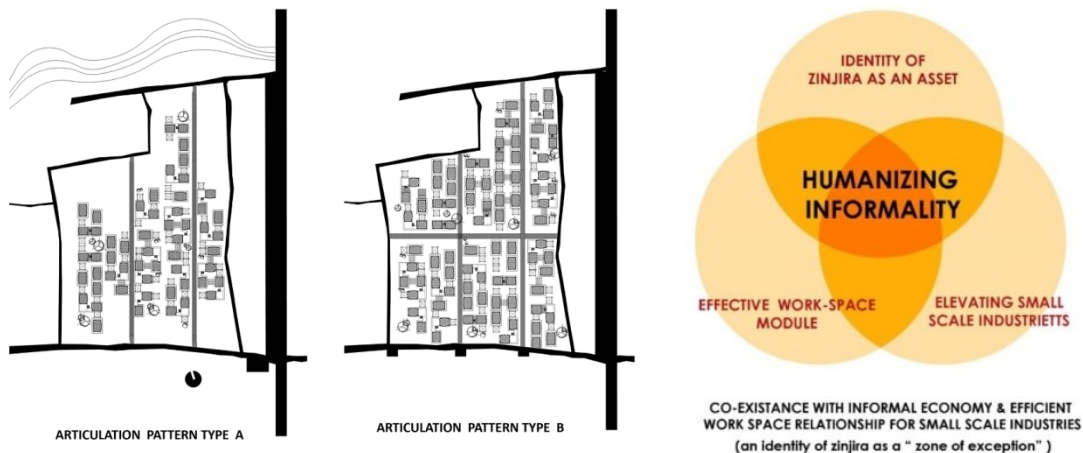


Diagram 7. Schematic guide for micro industry master-planning

Among the formal appearance the informality of Zinzira will have to find the humane balance to survive. Which can be further explained as improving the working condition and environment of this neglected workers and industry and giving it an interface through urban intervention and architectural manifestation. Author tries to phrase the situation as “humanizing informality” via giving it a formal presence. Which is termed as zone of exception and according to Roy [8] [9] this overlapping of informality and formality is an important factor to the survival of overall national economy structure.

7. Conclusion

The study is an attempt to find out the potentialities and constraints for the development of Zinzira metal industries area. During the study, special emphasis has been given to the work-

space relationship of small and micro metal industries. The research can be taken further by analyzing the economic frame work of the industries and establishing ties with major actors and assets at play. Further comprehensive master planning guideline can benefit the similar situation all over world. A similar impact of Pearl River Delta (PRD) master planning can be achieved in this context if the visions are taken into consideration along with further research on various possible economic models. If steps are not taken and let the usual approach continue the industry will eventually perish. And with it the opportunity to improve our economic stand .Further attention should be given from the government and BSCIC (Bangladesh Small and Cottage Industries Corporation) to help flourish Zinzira as a special economic zone. This is the high time to think for this area and it's already very important with the cities present context. Integrated development for the total area is urgently required as it will contribute to the local community and also for Dhaka city providing the option to reduce pressure on importing hardware parts from abroad while it can be easily manufactured in our country. The opportunity to reshape the image of the area should be taken seriously .This may indicate the ways to dream a new realm of community development project for Zinzira within the broader context of Dhaka city.

References

- Kishor Samal C. *Linkages between Informal and Formal Manufacturing Sectors. Economic and Political Weekly, Vol. 25, No. 23 (Jun. 9, 1990), pp. 1287-1288, Published by: Economic and Political Weekly*
- Rumana A. *A study on the impact of 2nd Buriganga bridge on the physical and socio economic condition of keraniganj upazila. 2010*
- Hasan. *Location analysis of manufacturing industries in keraniganj 2009*
- Atolagbe, A.M.O. *Architecture and culture: The dynamics of the informal sector in the changing house-form among the Yoruba in Nigeria. Global Advanced Research Journal of Social Science Vol1(2), pp047-052, July 2012*
- Boano, Hunter. *Congested urbanism in dharavi. 2013 the Bartlett development planning unit pp 90-94*
- Scott. *Model for new dharavi guidelines and principles. 1998*
- Jos Frijns. *Institute for Housing and Urban Development Studies, Rotterdam, The Netherlands Small-Scale Industry and Cleaner Production Strategies. World Development Vol. 27, No. 6, pp. 967±983, 1999*
- Ananya R. *Urban Informality: Toward an Epistemology of Planning*
- Ananya R. *Slumdog Cities: Rethinking Subaltern Urbanism. International Journal of Urban and Regional Research.*
- DOI: 10.1111/j.1468-2427.2011.01051.x